

**PUBLIC HEALTH NOTICE FOR PAHRUMP VALLEY RESIDENTS ON AIRBORNE PARTICULATES – Web Posting Date: 08/19/08**

**INTRODUCTION**

Outside on windy days there may be seen clouds of dust in the atmosphere in and around the town of Pahrump. This “fugitive dust” is picked up by the wind from disturbed vacant land, construction sites, newly plowed agricultural fields not yet covered with crops, unpaved roads, unpaved parking lots, and the surrounding desert. The dust then becomes entrained in the atmosphere. This fugitive dust seen in the air is particle pollution, and these dust episodes are negatively affecting the air quality all over the Pahrump Valley.

This particle pollution is known as “particulate matter”. Particulate matter (PM) is a complex mixture composed of dry solid fragments, solid cores with liquid coatings, and small liquid droplets. These tiny microscopic particles can be made up of many different materials such as metals, soot, soil and dust, and may contain bacteria and fungi. Much of this PM goes by the name PM<sub>10</sub> because of the size of the particles. The PM<sub>10</sub> particles are around 10 micrometers in diameter. A micrometer (sometimes called a micron) is one millionth of a meter, or 1/25,000 of an inch. An average human hair is about 70 microns in diameter. So, a 10 micron particle would be about 1/7 the diameter of a human hair. Four hundred PM<sub>10</sub> particles can fit end to end across the head of a pin.

Particles larger than PM<sub>10</sub> are trapped in the nose, throat, and trachea by mucous layers and cilia. However, particles larger than PM<sub>10</sub> still irritate the eyes and upper respiratory tract (inside of the nose and throat).

The PM<sub>10</sub> particles, on the other hand, are small enough to bypass the defenses of the upper respiratory tract, and are able to work their way down to penetrate into the upper airways of the lungs where the body has fewer defenses. Scientific studies have linked PM<sub>10</sub> particles with significant health problems such as:

- respiratory related emergency room visits and hospital admissions
- acute respiratory symptoms, including aggravated coughing, and difficult or painful breathing
- aggravated asthma
- chronic bronchitis
- decreased lung function resulting in shortness of breath
- increased susceptibility to respiratory infections
- increased ability of viruses, bacteria, fungi (which ride on the particles) to penetrate the lungs
- alterations in lung tissue and structure
- alterations in respiratory tract defense mechanisms

There are people who are most at risk from exposure to PM<sub>10</sub> particles. These people include:

**the elderly** – suffer premature death, or need to be admitted to the hospitals or visit the emergency rooms

**children** – are more active and spend more time outdoors than adults  
breathe 50% more air per pound of body weight than adults  
are more susceptible to environmental threats because their respiratory systems are still developing  
are increasingly being diagnosed with asthma  
are experiencing increased frequency of childhood illnesses  
are experiencing greater use of medication

In addition to the adverse health effects, PM<sub>10</sub> particles also cause damage to the environment and to materials.

The particles hanging in the air impair visibility of scenic vistas such as Mt. Charleston and the Spring Mountain Range. Driving in a dust episode can cause traffic accidents due to poor visibility and poor road traction due to accumulation of the slippery particulates on the road surface. As to materials, particles driven by the wind can cause “sandblasting” and pitting of statuary, stonework, stucco, picture windows, and painted surfaces of homes and outbuildings, resulting in increasing maintenance costs and more work and aggravation on the part of the homeowner. Wind driven particulates can penetrate and destroy or harm garden crops, flowers, decorative outdoor plants, and expensive landscaping.

In 1971, the Environmental Protection Agency (EPA) published the National Ambient Air Quality Standards (NAAQS) to define the levels (known as amounts or concentrations) of air quality necessary to protect the public health with an adequate margin of safety. Nevada State standards are equal to or more stringent than the National standards. The current primary 24-hour National and State standard for PM<sub>10</sub> is a concentration of 150 micrograms of PM<sub>10</sub> per cubic meter of air. In order to be in compliance with the standard, this means that the amount of PM<sub>10</sub> in the air cannot exceed 150 micrograms per cubic meter in the 24 hour period between midnight and the next midnight (12:00:00AM through 11:59:59 PM).

The State of Nevada Division of Environmental Protection (NDEP) maintains four monitors in the Pahrump Valley to track levels of PM<sub>10</sub> in the air. There is a monitor at Manse Elementary School; a second monitor at the Willow Creek Golf Course; the third monitor is southernmost and is located at Our Lady of the Valley Catholic Church; the fourth is at the northern end of Pahrump on Linda Street. The data collected from these monitors show whether the ambient air quality standards are being met or are being exceeded. In addition, the State also maintains a meteorological station near the Community Pool to collect such data as wind speed, wind direction, air temperature, rainfall, and solar radiation.

On days of normal air movement, the air in the valley moves at an average speed of 3.3 miles per hour with an average high of 6.7 mph. The meteorological station has recorded the direction of air movement to be from the north or northwest, and also from the southeast, south, or southwest. Air movement directly from the east or directly from the west does not seem to exist. The valley wide average PM<sub>10</sub> concentration over a 24-hour period on these normal days is about 24 micrograms per cubic meter of air with an average maximum of 42 micrograms per cubic meter. On windy days, however, the valley wide average hourly wind speed jumps to 17 miles per hour, and the average maximum wind gust is 31 miles per hour. The average duration of these elevated winds is 22 hours. During these wind events, the valley wide 24-hour average PM<sub>10</sub> concentration jumps to 63 micrograms per cubic meter of air from 24, and the average maximum concentration in that 24-hour period reaches 81 micrograms per cubic meter from 42. Keep in mind that these figures are averages for the entire Pahrump Valley. They show that wind speed and ambient PM<sub>10</sub> concentrations are connected, and that there is a clear distinction in the data between non-windy and windy days. The wind speeds and corresponding PM<sub>10</sub> concentrations in specific sections of the valley may be higher – high enough to result in an exceedance of the 24-hour PM<sub>10</sub> standard.

## EXCEEDANCES

During the 22 months from September 2006 through June 2008, NDEP has identified 11 days during which the 24 hour PM<sub>10</sub> standard was exceeded. In general, all of the exceedances occurred on days when there were several hours of elevated winds.

### **June 4, 2008:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of **224** micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150\mu\text{g}/\text{m}^3$ . There were six hourly averages with concentrations in excess of the 24-hour standard. Winds were out of the northwest during this interval. Wind speed values collected at the Manse site during June were not used due to anomalous readings attributed to wind speed sensor malfunction. June 4 data from the meteorological tower was employed instead. On normal days in June, the hourly average wind speed at the Manse Site is 3.4 mph with a high of 6.7 mph, and the 24-hour average PM<sub>10</sub> concentration is  $35\mu\text{g}/\text{m}^3$  with a high of  $51\mu\text{g}/\text{m}^3$ . Using wind data from the met tower from June 4 (see next paragraph), it is reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 51 mph, with hourly average wind speeds up to 37 mph. Winds were out of the northwest. There was no precipitation. The normal hourly average wind speed at the met tower during the month of June is 4.7 mph, and the normal peak prevailing wind speed is 9.4 mph.

### **May 21, 2008:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of **217** micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150\mu\text{g}/\text{m}^3$ . There were 11 hourly averages with concentrations in excess of the 24-hour standard. None of this concentration data was reported due to analyzer malfunction earlier in the month, resulting in invalid data and replacement of the analyzer on May 22.

The meteorological tower recorded northwesterly winds gusting to 33 mph, with hourly average wind speeds up to 27 mph. There was no precipitation. The normal hourly average wind speed at the met tower during the month of May is 4.7 mph, and the normal peak prevailing wind speed is 9.4 mph.

Wind speed values collected at the Manse site during May were not used due to anomalous readings attributed to wind speed sensor malfunction. May 21 data from the meteorological tower (above paragraph) was considered instead. On normal days in May, the hourly average wind speed at the Manse Site is 3.1 mph with a high of 6.0 mph, and the 24-hour average PM<sub>10</sub> concentration is  $33\mu\text{g}/\text{m}^3$  with a high of  $52\mu\text{g}/\text{m}^3$ . If the concentration data had been valid, it is reasonable to state that there would have been no exceedance but for the high wind event.

### **February 13, 2008:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of **223** micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150\mu\text{g}/\text{m}^3$ . There were nine hourly averages with concentrations in excess of the 24-hour standard. Winds were first out of the southeast, later shifting to the southwest, and finally to the northwest. Wind speed values collected at the Manse site during February were not used due to anomalous readings attributed to wind speed sensor malfunction. February 13 data from the meteorological tower was employed instead. On normal days in February, the hourly average wind speed at the Manse Site is 2.5 mph with a high of 5.4 mph, and the 24-hour average PM<sub>10</sub>

concentration is  $32 \mu\text{g}/\text{m}^3$  with a high of  $50 \mu\text{g}/\text{m}^3$ . Using wind data from the met tower from February 13 (see next paragraph), it is reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 40 mph, with hourly average wind speeds up to 30 mph. Winds were first out of the southeast, later shifting to the southwest, then shifting to the northwest. There was no precipitation. The normal hourly average wind speed at the met tower during the month of February is 3.8 mph, and the normal peak prevailing wind speed is 7.4 mph.

**November 23, 2007:**

At the Manse Elementary School Site, 24-hour average  $\text{PM}_{10}$  concentrations of  $166 \mu\text{g}/\text{m}^3$  were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150 \mu\text{g}/\text{m}^3$ . There were five hourly averages with concentrations in excess of the 24-hour standard. Winds were out of the northwest. Wind speed values collected at the Manse site during November were not used due to anomalous readings attributed to wind speed sensor malfunction. On normal days in November, the hourly average wind speed at the Manse Site is 1.8 mph with a high of 3.6 mph, and the 24-hour average  $\text{PM}_{10}$  concentration is  $49 \mu\text{g}/\text{m}^3$  with a high of  $70 \mu\text{g}/\text{m}^3$ . Using wind data from the met tower from November 23, it is reasonable to state that there would have been no exceedance but for the high wind event.

At the Linda Street Site, 24-hour average  $\text{PM}_{10}$  concentrations of  $171 \mu\text{g}/\text{m}^3$  were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150 \mu\text{g}/\text{m}^3$ . There were five hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 34 mph, with hourly average wind speeds up to 21 mph. On normal days in November, the hourly average wind speed at the Linda Site is 3.8 mph with a high of 6.5 mph, and the 24-hour average  $\text{PM}_{10}$  concentration is  $13 \mu\text{g}/\text{m}^3$  with a high of  $30 \mu\text{g}/\text{m}^3$ . It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 31 mph, with hourly average wind speeds up to 24 mph. Winds were out of the northwest all day. There was no precipitation. The normal hourly average wind speed at the met tower during the month of November is 2.9 mph, and the normal peak prevailing wind speed is 6.0 mph.

**June 5, 2007:**

At the Manse Elementary School Site, 24-hour average  $\text{PM}_{10}$  concentrations of  $326 \mu\text{g}/\text{m}^3$  were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150 \mu\text{g}/\text{m}^3$ . There were 14 hourly averages with concentrations in excess of the 24-hour standard. Winds were southerly, gusting to 42 mph, with hourly average wind speeds up to 17 mph. On normal days in June, the hourly average wind speed at the Manse Site is 3.4 mph with a high of 6.7 mph, and the 24-hour average  $\text{PM}_{10}$  concentration is  $35 \mu\text{g}/\text{m}^3$  with a high of  $51 \mu\text{g}/\text{m}^3$ . It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

At the Willow Creek Site, 24-hour average  $\text{PM}_{10}$  concentrations of  $232 \mu\text{g}/\text{m}^3$  were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of  $150 \mu\text{g}/\text{m}^3$ . There were 14 hourly averages with concentrations in excess of the 24-hour standard. Winds were southerly, gusting to 45 mph, with hourly average wind speeds up to 19 mph. On normal days in June, the hourly average wind speed at the Willow Creek Site is 3.4 mph with a high of 7.2 mph, and the 24-hour average  $\text{PM}_{10}$  concentration is  $30 \mu\text{g}/\text{m}^3$  with a high of  $48 \mu\text{g}/\text{m}^3$ . It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 42 mph, with hourly average wind speeds up to 29 mph. Winds were southerly, and there was no precipitation. The normal hourly average wind speed at the met tower during the month of June is 4.7 mph, and the normal peak prevailing wind speed is 9.4 mph.

**May 2, 2007:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of 172µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were eight hourly averages with concentrations in excess of the 24-hour standard. Winds were southerly, gusting to 35 mph, with hourly average wind speeds up to 14 mph. On normal days in May, the hourly average wind speed at the Manse Site is 3.1 mph with a high of 6.0 mph, and the 24-hour average PM<sub>10</sub> concentration is 33 µg/ m<sup>3</sup> with a high of 52 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 34 mph, with hourly average wind speeds up to 23 mph. Winds were southerly, and there was no precipitation. The normal hourly average wind speed at the met tower during the month of May is 4.7 mph, and the normal peak prevailing wind speed is 9.4 mph.

**March 27, 2007:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of 171µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were 11 hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 36 mph, with hourly average wind speeds up to 16 mph. On normal days in March, the hourly average wind speed at the Manse Site is 2.7 mph with a high of 5.4 mph, and the 24-hour average PM<sub>10</sub> concentration is 33 µg/ m<sup>3</sup> with a high of 59 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 40 mph, with hourly average wind speeds up to 22 mph. Winds were out of the northwest all day. There was no precipitation. The normal hourly average wind speed at the met tower during the month of March is 4.3 mph, and the normal peak prevailing wind speed is 8.9 mph.

**January 5, 2007:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of 354µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were 15 hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 38 mph, with hourly average wind speeds up to 26 mph. On normal days in January, the hourly average wind speed at the Manse Site is 2.2 mph with a high of 5.1 mph, and the 24-hour average PM<sub>10</sub> concentration is 38 µg/ m<sup>3</sup> with a high of 55 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

At the Willow Creek Site, 24-hour average PM<sub>10</sub> concentrations of 174µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were five hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 48 mph, with hourly average wind speeds up to 25 mph. On normal days in January, the hourly average wind speed at the Willow Creek Site is 2.2 mph with a high of 4.9 mph, and the 24-hour average PM<sub>10</sub> concentration is 19 µg/ m<sup>3</sup> with a high of 34 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 50 mph, with hourly average wind speeds up to 35 mph. Winds were out of the northwest all day. There was no precipitation. The normal hourly average wind speed at the met tower during the month of January is 3.6 mph, and the normal peak prevailing wind speed is 7.4 mph.

**December 28, 2006:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of **559**µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were 18 hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 34 mph, with hourly average wind speeds up to 27 mph. On normal days in December, the hourly average wind speed at the Manse Site is 1.8 mph with a high of 3.8 mph, and the 24-hour average PM<sub>10</sub> concentration is 38 µg/ m<sup>3</sup> with a high of 80 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 47 mph, with hourly average wind speeds up to 34 mph. Winds were out of the northwest all day. There was no precipitation. The normal hourly average wind speed at the met tower during the month of December is 3.1 mph, and the normal peak prevailing wind speed is 6.3 mph.

**November 29, 2006:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of **271**µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were 12 hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 40 mph, with hourly average wind speeds up to 20 mph. On normal days in November, the hourly average wind speed at the Manse Site is 1.8 mph with a high of 3.6 mph, and the 24-hour average PM<sub>10</sub> concentration is 49 µg/ m<sup>3</sup> with a high of 70 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

At the Willow Creek Site, 24-hour average PM<sub>10</sub> concentrations of **212**µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were nine hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 47 mph, with hourly average wind speeds up to 22 mph. On normal days in November, the hourly average wind speed at the Willow Creek Site is 2.0 mph with a high of 4.7 mph, and the 24-hour average PM<sub>10</sub> concentration is 39 µg/ m<sup>3</sup> with a high of 64 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

At the Church Site, 24-hour average PM<sub>10</sub> concentrations of **169**µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were five hourly averages with concentrations in excess of the 24-hour standard. Winds were northwesterly, gusting to 36 mph, with hourly average wind speeds up to 18 mph. On normal days in November, the hourly average wind speed at the Church Site is 2.2 mph with a high of 3.8 mph, and the 24-hour average PM<sub>10</sub> concentration is 26 µg/ m<sup>3</sup> with a high of 47 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 45 mph, with hourly average wind speeds up to 32 mph. Winds were out of the northwest all day. There was no precipitation. The normal hourly average wind speed at the met tower during the month of November is 2.9 mph, and the normal peak prevailing wind speed is 6.0 mph.

**September 22, 2006:**

At the Manse Elementary School Site, 24-hour average PM<sub>10</sub> concentrations of **218**µg/m<sup>3</sup> were recorded with a Beta Attenuation Monitor operating on an every-day schedule. This concentration exceeds the 24-hour standard of 150µg/m<sup>3</sup>. There were eight hourly averages with concentrations in excess of the 24-hour standard. Winds were southeasterly, shifting to the northwest, gusting to 36 mph, with hourly average wind speeds up to 29 mph. On normal days in September, the hourly average wind speed at the Manse Site is 2.5 mph with a high of 5.4 mph, and the 24-hour average PM<sub>10</sub> concentration is 38 µg/ m<sup>3</sup> with a high of 84 µg/ m<sup>3</sup>. It is therefore reasonable to state that there would have been no exceedance but for the high wind event.

The meteorological tower recorded winds gusting to 36 mph, with hourly average wind speeds up to 29 mph. Winds were southeasterly, shifting to the northwest. There was no precipitation. The normal hourly average wind speed at the met tower during the month of September is 3.8 mph, and the normal peak prevailing wind speed is 8.7 mph.

**DUST CONTROL MEASURES**

In 2003, Nye County began to develop fugitive dust regulations through cooperation with NDEP and the US Environmental Protection Agency. In that same year, NDEP implemented provisions for dust control for air quality Surface Area Disturbance (SAD) permits issued in Pahrump Valley, and initiated public outreach in the Town of Pahrump to alert the community to the new regulations regarding the dust issues. Public outreach and workshops were conducted in 2003 through early 2005.

In August 2004, an air quality bill was approved by Nye County Commissioners, and in January 2005, Ordinance No. 259, the Nye County Fugitive Dust Ordinance, became effective.

In June 2006, the Nye County Fugitive Dust Ordinance was formally implemented. A local Nye County-NDEP inspector was hired, and the Pahrump Compliance Review Committee (CRC) was created. The Committee, consisting of Nye County officials, considers all appeals to violations issued by the local inspector and reviews the penalties assessed by him. In 2006 and most of 2007, NDEP served in an advisory capacity in Nye County's program to implement the Fugitive Dust Ordinance. In December 2007, the program was fully delegated to Nye County for implementation.